REMARKS

This is intended as a full and complete response to the Office Action dated July 6, 2001, having a shortened statutory period for response set to expire on October 6, 2001. Claims 1-71 are pending in the application. Claims 1-15, 29-34, 41-51 and 71, were considered and stand rejected by the Examiner. Claims 16-28, 35-40, and 52-70, have been withdrawn from consideration by the Examiner. Applicants cancel claims 2-3, 16-28, 35-40, and 52-70, without prejudice. Applicants present new claims 72-80 for consideration by the Examiner. Applicants believe that no new matters have been introduced in this amendment.

Claim 15 is rejected under 35 U.S.C. § 112, second paragraph. Claim 15 has been amended to more clearly recite a range of the surface area. Withdrawal of the rejection is respectfully requested.

Claims 1, 29-34, 41-44, 46-51, and 71, stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Degner et al.* (U.S. Patent No. 5,074,456). The Examiner states that *Degnar et al.* shows the invention as claimed. The Examiner also asserts that *Degnar et al.* discloses the materials of claims 31-32, 34, and 47-51. Applicants respectfully traverse this rejection.

Degnar et al. discloses an electrode plate coupled to a support frame disposed in a processing chamber. Processing gas is distributed into the processing chamber for material deposition through apertures formed through the electrode plate and support frame. The support frame is secured to a backing plate. A cooling water source is coupled to a cooling channel formed in the upper surface of a backing plate and the cooling channel is sealed by a ring plate.

Degnar et al. does not teach, show or suggest a chamber cover comprising a retaining ring and a lid assembly connected to the retaining ring by one or more feedthroughs, the lid assembly comprising a first plate and a second plate connected together and defining a fluid channel therebetween and a fluid inlet and outlet fluidly connected to the fluid channel, wherein the one or more feedthroughs enable fluid flow into and out of the fluid inlet and fluid outlet, as recited in claim 1 and claims dependent thereon.

Further, *Degnar et al.* does not teach, show or suggest a chamber cover having a second electrode opposed to the first electrode, the second electrode comprising a chamber cover having a second electrode opposed to the first electrode, the second electrode comprising a plate assembly having a bottom surface disposed at least partially in the enclosure and an upper surface connected to a support frame, and one or more cooling channels disposed at least partially in the plate assembly, and one or more fluid connectors fluidly connected to the one or more cooling channels as recited in claim 29, and claims dependent thereon.

Still further, *Degnar et al.* does not teach, show or suggest a chamber cover facing a workpiece support, the chamber cover comprising a backing plate and a facing plate having at least one cooling channel disposed in the facing plate and defining one or more fluid pathways distributed over the area of the electrode, as recited in claim 41 and claims dependent thereon. Therefore, *Degnar et al.* does not teach, show or suggest the claimed aspects of the invention. Withdrawal of the rejection is respectfully requested.

Claims 1, 4-9 and 11-15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by, or alternatively, under 35 U.S.C. § 103(a) unpatentable over *Lei et al.* (U.S. Patent No. 5,968,276). The Examiner asserts that *Lei et al.* discloses the invention as claimed. Applicants respectfully traverse this rejection.

Lei et al. discloses a gas distribution plate having an annular coolant liquid passage formed as a sealed annular groove around the circumference of the gas distribution plate. The annular groove is sealed by a mating ring disposed on top of the annular groove and which further provides an inlet port and outlet port communicating with the annular groove.

Lei et al. does not teach, show or suggest a chamber cover comprising a retaining ring and a lid assembly connected to the retaining ring by one or more feedthroughs, the lid assembly comprising a first plate and a second plate connected together and defining a fluid channel therebetween and a fluid inlet and outlet fluidly connected to the fluid channel, wherein the one or more feedthroughs enable fluid flow into and out of the fluid inlet and fluid outlet, as recited in claim 1 and claims dependent

thereon. Therefore, *Lei et al.* does not teach, show or suggest the claimed aspects of the invention. Withdrawal of the rejection is respectfully requested.

Claims 4-15 and 45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over obvious over *Degner et al.* (U.S. Patent No. 5,074,456) in view of *Lei et al.* (U.S. Patent No. 5,968,276). The Examiner asserts that it would have been obvious to modify the apparatus disclosed by *Degner et al.* as to further comprise the claimed feedthrough because the arrangement provides for increased liquid flow and allows maintenance or disassembly of the feedthrough without breaking the seal on the coolant system as described by *Lei et al.* The Examiner further states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by *Degner et al.* and *Lei et al.* to make the first and second plates comprise a portion of the fluid channel and to have a passageway surface area of at least about 35% of the surface area of the lid. Applicants respectfully traverse this rejection.

Degner et al. and *Lei et al.* are described and distinguished above. As claims 4-15 and 45 depend from independent claims 1 and 41, respectively, Applicants believe that claims 4-15 and 45 are patentable for at least the same reasons as argued above for independent claims 1 and 41. Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of the claims.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the claimed aspects of the invention. Having addressed all issues set out in the office action, applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

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APPENDIX

IN THE SPECIFICATION:

Please replace the paragraph at page 6, line 21, to page 7, line 5, with the following paragraph:

Figure 1 is a cross sectional view of one embodiment of an etch chamber 2 of the present invention having a generally flat lid assembly 8, including an energy transparent window 48. The chamber 2 generally includes an annular sidewall 4, a bottom wall 6, and a lid assembly 8. A pedestal 18 operating as a cathode is disposed in the lower portion of the chamber and supports a substrate 24 during processing. The pedestal 18 is connected to a cathode power supply 5 which typically biases the pedestal to a negative voltage. A protective edge ring 22 is disposed on the upper surface 20 of the pedestal 18 and defines a perimeter in which a substrate 24 is positioned during processing. A cathode liner 34 may be disposed in the chamber to surround the pedestal 18 and form a sacrificial deposition area which can be easily removed and cleaned. Similarly, an anode liner 32 may be disposed about the interior of the sidewall 4 to provide a removable surface on which deposition can occur during processing and be easily removed for cleaning. An array 130 of induction coils is disposed above the energy transparent window 48 and will be described in detail below. Process gases are introduced into the etch chamber 2 via a variety of means (not shown), such as by a lower gas feed 196 as shown in Figures 9 and 10. Excessive process gases and volatile compounds produced during processing are exhausted through a gas outlet 36 by a vacuum pump (not shown). The chamber also includes a slit opening 26 through which substrates enter and exit the processing chamber.

Please replace the paragraph at page 7, lines 19-25, with the following paragraph:

Figures 2-3 depict the wedge shape of each of the eight induction coils 140, 142 in the array 130, the coils being equally spaced around the azimuth of the chamber lid

8. As shown in Figures 2 and 3, each coil 140, 142 has a number of turns of copper wire [142] 143 wound around a hollow coil form 150. Each coil form has a wedge-shaped top surface 154 and a U-shaped cross section when viewed from the side. Specifically, each coil form 150 consists of a curved, rectangular, wide outer surface 153; an almost triangular, wedge-shaped top surface 154; and a curved, narrow, inner tip surface 155. The azimuthal sides 144 of each coil form are open.

Please replace the paragraph at page 9, lines 12-27, with the following paragraph:

Figures 5 and 6 are a bottom and top view of top and bottom plates 92, 94, respectively. The groove 100 is formed in the lower surface of the top plate 92 and extends from an inlet/outlet, referred to herein as a feedthrough pocket 66, located at the perimeter of the window 48 inwardly toward the center of the window 48. The feedthrough pocket 66 has a first and second diameter which define a pocket shoulder 76 therebetween on which an o-ring can be compressed to form a seal between the retaining ring, the feedthrough pocket 66 of the window and the feedthrough, the latter two will be described in more detail below. The feedthrough pockets are preferably symmetrically arranged about the window for ease in alignment with the retaining ring and the window and to provide uniform flow of fluids into and out of the window. The groove 100 then forms a semicircular pattern as the groove extends outwardly to another inlet/outlet corresponding to a second feedthrough pocket 66 disposed on the outer perimeter of the window 48. Similarly, a groove 112 is formed in the upper surface of the bottom plate 94 and is adapted to mate with the channel 100 of the top plate when the plates are sealed together. The outer perimeter of the bottom plate 94 includes a shoulder 88 (as shown in Figure 8) which assists in aligning the window in the inner diameter of the chamber and supporting the window on the chamber sidewall 4.

Please replace the paragraph at page 14, lines 9-22, with the following paragraph:

A cooling assembly of the invention is provided to deliver a cooling fluid to the electrode plate 212. Channels 64 are formed in the electrode plate 212 and are connected to a source of fluid by one or more feedthroughs 54 disposed through the support frame 214 and backing plate 280. The backing plate 280 and support frame 214 provide a channel in which the feedthrough is disposed to connect to the electrode plate 212 to deliver fluid thereto. The connection to the electrode plate 212 can be formed as shown in the embodiment of Figures 1 and 4-8 described above. The plate 212 is formed of two facing members which may be made of the same or different materials similarly to the embodiments described above. In addition, the channels 64 may be formed in both [plates] members or substantially in one [plate] member with a generally smooth surface of the other [plate] member forming a wall of the channels. In addition, the top [plate] member may be a metal or conductive material while the bottom [plate] member is a silicon containing material. In a preferred embodiment, both [plates] members are formed of a silicon containing material. Both [plates] members could be a metal or other conductive material.

IN THE CLAIMS:

Please cancel claims 2-3, 16-28, 35-40, and 52-70, without prejudice, and amend the following claims:

1. (Twice Amended) A processing chamber, comprising:
   a) a chamber body having a substrate support member disposed therein;
   b) a chamber cover, comprising:
      i) a retaining ring; and
      ii) a lid assembly connected to the retaining ring by one or more feedthroughs, the lid assembly, comprising:
         a) a first plate and a second plate connected together and defining a fluid channel therebetween; and

b) a fluid inlet and outlet fluidly connected to the fluid channel, wherein the one or more feedthroughs enable fluid flow into and out of the fluid inlet and fluid outlet.

4. (Twice Amended) The processing chamber of claim 1, wherein the lid assembly further comprises one or more feedthrough pockets in which the one or more feedthroughs are received to connect the lid assembly to the retaining ring.

10. (Twice Amended) The processing chamber of claim 8, wherein the retaining ring comprises a pocket alignment shoulder adapted to align the lid assembly to the retaining ring.

13. (Twice Amended) The processing chamber of claim 12, further comprising a feedthrough pocket fluidly connected to the lid assembly passageway and adapted to connect to a feedthrough to secure the lid assembly to the retaining ring.

14. (Twice Amended) The processing chamber of claim 13, wherein the passageway forms a circuitous pattern substantially throughout the lid assembly.

15. (Twice Amended) The processing chamber of claim 14, wherein the passageway surface area comprises [at least about 35%] between about 30% and about 60% of the surface area of the lid assembly.

29. (Twice Amended) A processing chamber, comprising:

an enclosure having a first electrode for supporting a substrate in the enclosure; and

a chamber cover having a second electrode opposed to the first electrode, the second electrode comprising:

a [first] plate assembly having a [first] bottom surface disposed at least partially in the enclosure and [a second] an upper surface connected to a support frame; and

one or more cooling channels disposed at least partially in the [first] plate assembly; and

one or more fluid connectors fluidly connected to the one or more cooling channels.

30. (Twice Amended) The processing chamber of claim 29, further comprising a power source connected to the second electrode.

31. (Amended) The processing chamber of claim 29, wherein the [first] plate assembly is comprised of a material selected from the group consisting of graphite, polycrystalline silicon, quartz, glassy carbon, single crystal silicon, pyrolytic graphite, silicon carbide, alumina, zirconium, diamond coated materials, titanium oxide or combinations thereof.

32. (Twice Amended) The processing chamber of claim 29, wherein the [first] plate assembly is comprised of a metal.

33. (Amended) The processing chamber of claim 29, further comprising a backing plate adjacent a sidewall of the [first] plate assembly opposite the first electrode.

34. (Twice Amended) The processing chamber of claim 33, wherein the backing plate is comprised of a metal and the [first] plate assembly is comprised of a material selected from the group consisting of graphite, polycrystalline silicon, quartz, glassy carbon, single crystal silicon, pyrolytic graphite, silicon carbide, alumina, zirconium, diamond coated materials, titanium oxide or combinations thereof.

41. (Twice Amended) A processing chamber for processing a workpiece, comprising:

a workpiece support; and

a chamber cover facing said workpiece support, the chamber cover [having] comprising:

a backing plate; and

a facing plate having at least one [fluid] cooling channel [defined within said chamber cover] disposed therein and defining one or more [fluid] cooling pathways distributed [generally] over the area of the [chamber cover] facing plate.

42. (Twice Amended) The chamber of claim 71_1 wherein the second plate comprises an electrode and the [fluid] cooling channel is disposed at least partially between the first and second plates.

43. (Twice Amended) The chamber of claim 42_1 wherein the channel is partially formed between the first and second plates.

44. (Twice Amended) The chamber of claim 42_1 wherein the channel is defined by a groove in one of the plates and the generally smooth opposing face of the other plate.

45. (Twice Amended) The chamber of claim 42_1 wherein the channel is defined by grooves formed in both the first and second plates.

46. (Twice Amended) The chamber of claim 71_1 wherein the one or more [fluid] cooling pathways are arcuate, radial, meandering or combinations thereof.

47. (Twice Amended) The chamber of claim 71_1 wherein the chamber cover is comprised of a dielectric material, a conductive material, a semiconductive material, or combinations thereof.

48. (Twice Amended) The chamber of claim 71_1 wherein one plate is comprised of one material and the other plate is comprised of another material.

49. (Twice Amended) The chamber of claim 47_1 wherein the plate facing the workpiece support is comprised of a silicon containing material.

50. (Twice Amended) The chamber of claim 47_1 wherein at least one plate is comprised of a metal or alloy thereof.

51. (Twice Amended) The chamber of claim 47_1 wherein at least one plate is comprised of aluminum oxide or aluminum nitride.

71. (Amended) The processing chamber of claim 41_1 wherein the [chamber cover further] facing plate comprises:

a first plate; and

a second plate sealably engaged with the first plate.